

**REMARKS/ARGUMENTS**

Reconsideration of the above-identified application is respectfully requested. Claims 1-21, 24, and 26-41 are pending.

Claim 32 has been amended to clarify that the pressure pipe comprises the carbon black in an amount effective for prevention of UV degradation, such as supported at page 3, lines 6-16, page 14, lines 1-12, and page 17, lines 1-7, elsewhere in the present application.

Accordingly, full support exists in the present application for the amendment and no questions of new matter should arise.

**Rejection of Claim 32 under 35 U.S.C. §112, first paragraph**

At page 2 of the Office Action, claim 32 was rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner states that there is not sufficient disclosure of carbon black in a UV pipe; the patents on pg. 16 do not describe this kind of pipe, and the uses on line 7 do not correlate with UV properties or uses. The Examiner also appears to inquire about the relationship of 'jacketing' with UV. This rejection is respectfully traversed.

Original claim 32 recited, *inter alia*, a "UV pressure pipe." As explained in the present application, carbon blacks may be utilized to impart electrical conductivity and protection from ultraviolet (UV) degradation to polymer compositions, such as to minimize the degradation of polymer compositions upon exposure to ultraviolet (UV) radiation. As also explained in the application, carbon blacks useful in polymeric compositions which can be formed into pipes, such as pressure pipes, should have a variety of properties such as, but not limited to, longevity of service life of the pipe, *prevention of UV degradation*, low extractables, and the like (page 3,

lines 6-9). The present application further discloses polymeric compositions including carbon blacks which have appropriate properties for applications such as “UV applications” like pipe, film, membranes, jacketing, and the like (e.g. see page 3, lines 14-16 and page 16, lines 5-7). The present application also explains that any amount of carbon black effective to achieve an intended end use can be used, and general and preferred range amounts thereof are further provided (e.g. see page 14, lines 1-12 and page 17, lines 1-7). Thus, a “UV application” such as a “UV pressure pipe” recited in original claim 32 would be understood by a person skilled in the art to refer to the use of the carbon black in a polymer composition forming part of a product in an amount effective for prevention of UV degradation. Claim 32 has been amended to clarify this meaning of the “UV” language. Methods for making the carbon black, formulating it with a polymer, and pressure pipe designs that can be formed at least in part from the polymeric compositions (e.g. see page 16, lines 4-15), are also described and/or incorporated by reference in the present application. In view thereof, the applicant respectfully submits that a sufficient disclosure of carbon black in a UV pipe is provided in the present application. The term “jacketing” is not recited in claim 32. Claim 30 recites, *inter alia*, “cable jacketing,” but it is not qualified by “UV.” Even if it were, it would be understood to impart the same qualification as explained above relative to the “UV pressure pipe” of original claim 32.

In view of the above reasons, the subject matter of the “UV pressure pipe” recited in original and present claim 32 was described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

Reconsideration and withdrawal of this rejection are requested.

**Rejection of Claim 32 under 35 U.S.C. §112, second paragraph**

At page 2 of the Office Action, claim 32 was also rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states it is not clear what a 'UV pressure pipe' is, or how UV radiation relates to pressure. This rejection is respectfully traversed.

As indicated, a "UV pressure pipe," such as recited in original claim 32, would be understood by a person skilled in the art to refer to use of the carbon black in a polymer composition forming part of a pressure pipe in an amount effective for prevention of UV degradation. As also indicated, claim 32 has been amended to further clarify this meaning of the "UV" language with respect to the recited pipe. Claim 32 defines the subject matter sought to be patented with a reasonable degree of particularity and distinctness.

Reconsideration and withdrawal of this rejection are requested.

**Rejection of Claims 1-21, 24, 26-30, and 34-40 under 35 U.S.C. §102(b) -- Sant '250 in view of Industrial Carbon and the Medalia Article**

At page 3 of the Office Action, claims 1-21, 24, 26-30, and 34-40 were rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,877,250 to Sant (Sant '250) in view of Industrial Carbon (Mantell, C.L., INDUSTRIAL CARBON, 2nd ed., 1946, p. 60) and the Medalia article (A.I. Medalia et al., "Particulate Carbon And Other Components Of Soot And Carbon Black," *Carbon*, Vol. 20, No. 6, pp.481-492 (1982)). The Examiner states that the Sant '250 reference teaches what appears to be the claimed carbon black. The Examiner also states that the present specification, at pg. 13, indicates that the present carbon black is the same as that of Sant, with no modifications made, so the other properties appear possessed. This rejection is respectfully

traversed.

The present invention is directed to carbon blacks, and polymer compositions and articles that incorporate these carbon blacks, wherein the carbon blacks have an I<sub>2</sub> No. of from about 50 to about 112 mg/g, a primary particle size of not greater than 25 nm, and at least the following properties: a) an ash content of less than 0.1%; b) a total sulfur content of less than about 2%; and c) a 325 mesh residue of about 20 ppm or less (page 3, lines 14-16; page 3, line 23 to page 4, line 4; page 4, lines 16-17; page 6, line 20 to page 7, line 3). The carbon blacks that combine these characteristics have appropriate properties for use in polymeric compositions, such as UV applications like pipe, film, membranes, jacketing, and the like (page 3, lines 14-16; page 4, lines 18-20). An advantage of the carbon blacks of the present invention is that the carbon blacks preferably impart low viscosity to the polymer compositions into which they are incorporated (page 16, lines 16-18). Another advantage of the carbon blacks of the present invention is that the carbon blacks impart low CMA (compound moisture absorption) to the polymer compositions into which they are incorporated (page 16, lines 19-21). A further advantage of the carbon blacks of the present invention is that the carbon blacks can be incorporated at high carbon black loadings into polymer compositions (page 16, lines 22-24).

The reference to Sant '250 at page 13 of the present application is with respect to the processes that can be used to make "carbon black products" in general. The reference to "carbon black products" at page 13 is simply with respect to the raw materials, as well as the products that can incorporate carbon black, such as the polymer compositions. It is respectfully noted that the term "carbon black products" is referred to when the present application refers at page 13 to Sant '250, and not the term "carbon blacks." In view of this clarification, Sant '250 does not teach or suggest the carbon blacks of the present invention as set forth, for instance, in claim 1 and the

dependent claims.

At page 6 of the Office Action, the Examiner has also referred to the title of Sant '250, which recites "Carbon Blacks and Compositions Incorporating The Carbon Blacks," and stated "[s]o clearly, a carbon black product is a carbon black by itself; it is the extra ingredients that make it a 'composition'." The applicant respectfully disagrees. Sant '250 clearly describes a "product" of carbon black as referring to a processed mixture of carbon black *and* polymer (e.g. see col. 9, lines 28-41 and col. 15, lines 47-61). The above-indicated reference in the title of Sant '250 to "compositions" incorporating the carbon blacks clearly was not the exclusive or governing characterization in the reference of carbon blacks as combined with something else. In view of at least these reasons, no admission was made at page 13 of the present application that the Sant '250 patent teaches or suggests the claimed invention.

Sant '250 also does not teach or suggest an ash content, sulfur content, or a 325 mesh residue as recited in the claims of the present application (e.g., see Examples 1-14, Table 3, at cols. 14-15). The Medalia article cited by the Examiner clearly and unequivocally teaches that a number of prior carbon blacks all had an ash content *significantly exceeding* 0.1%. Reference is made in this respect to carbon black samples #375, RC (Fluffy), N351, N762, N472 and NC in Table 1 on page 489 of the Medalia article. As indicated in Table 1 of the Medalia article, these prior carbon blacks had original ash content ranging from 0.27 to 0.92%. These ash contents are approximately 300% higher or more than the ash content of less than 0.1% specified for the presently claimed carbon black. Therefore, these conventional carbon black values evidenced by Medalia do not anticipate or suggest the much lower ash content and sulfur content for the carbon blacks of the present invention, which are also provided at the prescribed primary particle size range and iodine number value range.

The Industrial Carbon reference fails to make up for this difference, as it has nothing to say about ash content or iodine values of carbon blacks. Industrial Carbon refers to a sulfur content that ordinarily can be as low as 0.01 to 0.03 but that occasionally values as high as 0.4% are encountered. The Industrial Carbon reference also specifically states that carbon blacks leave traces on the 325 mesh screen and the weight percents can be from 0.03 to 0.15 percent. 0.03 percent equates to 300 ppm, which is outside of the range recited in claim 1, which is a 325 mesh residue of less than 20 ppm. Further, the reference in Industrial Carbon to carbon black “traces” left on 325 mesh screen (44 micron) on screen analysis, or, in poorer grades, 0.03 to 0.15%, is understood to be an independent parameter from ash content. In addition, Industrial Carbon refers to carbon blacks having an estimated diameter of from 60 to less than 20 millimicrons. However, the Industrial Carbon reference nowhere suggests that ash content and iodine values can be predicted from sulfur content, 325 mesh and/or particle sizes that might be known for a given carbon black. Further, there is no teaching, motivation, or prediction of success for one skilled in the art to make the carbon blacks having the particular combined parameters of claim 1.

In view of the above facts and evidence, this anticipation rejection is inappropriate since the Examiner is relying on multiple references, inclusive of Industrial Carbon and the Medalia article, to reject these claims under an anticipation rejection in a manner that does not comport with “modest flexibility” allowed under certain circumstances to the all elements rule of anticipation (e.g. see M.P.E.P. §2131.01, III). In view of the reasons explained above, the Industrial Carbon reference and the Medalia article are not evidence that makes clear that the ash content and 325 mesh residue properties that are presently recited are *necessarily present* in the carbon black disclosed by Sant ‘250, and that it would be so recognized by persons of ordinary skill. Therefore, the applicant’s traversal of the “multiple-reference 102” is based on an argument that the additional references are

not probative evidence that the above-indicated missing features in Sant '250 are nonetheless inferable to the carbon black that is disclosed.

In view of the above-identified differences between the present claim 1 and Sant '250, Industrial Carbon, and Medalia, it is apparent that the Examiner has not established a prima facie case of anticipation (or obviousness) against present claim 1. Therefore, no experimental analysis should be required of applicant to show the presently carbon blacks are not inherent or obvious over a carbon black disclosed by Sant '250.

In view of the above differences, and contrary to the assertion made in the Office Action (page 3), the Examiner has not found in the art "what appears to be the claimed carbon black" as presently claimed. In relevant part, M.P.E.P. § 2112, IV, instructs as follows:

" ... Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted) ...

In view of the above explanations, it is apparent that the Examiner has attempted to premise an anticipation rejection of claim 1 based on mere probabilities or possibilities, which is improper.

Claims 2-21, 24, 26-30, and 34-40, which ultimately depend from claim 1, are not anticipated by nor obvious over Sant '250, Industrial Carbon and the Medalia article, for at least the same reasons as set forth above relative to their parent claim 1, and reference is made thereto.

In view of the above, the applicant requests reconsideration and withdrawal of the rejection.

**Rejection of Claims 1-21, 24, 26-30, and 34-40 under 35 U.S.C. §102(b) -- Sant '251 in view of Industrial Carbon and the Medalia Article**

At page 3 of the Office Action, claims 1-21, 24, 26-30, and 34-40 were rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,877,251 to Sant (Sant '251) in view of Industrial Carbon and the Medalia article. The Examiner states the Sant '251 reference teaches a carbon black having a size of 25 nm or less and an iodine number of 50-112. The Examiner also states that the present specification, at pg. 13, indicates that the present carbon black is the same as that of Sant, with no modifications made, so the other properties appear possessed. This rejection is respectfully traversed.

For the same reasons as explained above with respect to Sant '250, the reference to Sant '251 at page 13 of the present application is with respect to the processes that can be used to make "carbon black products" in general, and not carbon blacks such as presently claimed. As with Sant '250, Sant '251 also clearly describes a "product" of carbon black as referring to a processed mixture of carbon black *and* polymer (e.g. see col. 17, lines 6-23 and col. 30, line 59 to col. 31, line 11). No admission was made at page 13 of the present application that the Sant '251 patent teaches or suggests the claimed invention.

Sant '251 also does not teach or suggest an ash content, sulfur content, or a 325 mesh residue as recited in the claims of the present application (e.g., see Examples 1-33, Table 3, at cols. 28-30). As indicated, the Medalia article cited by the Examiner clearly and unequivocally teaches that a number of prior carbon blacks all had an ash content *significantly exceeding* 0.1%. As also indicated, the Industrial Carbon reference fails to make up for this difference, as it has nothing to say about ash content or iodine values of carbon blacks. Also, the Industrial Carbon reference nowhere suggests that ash content and iodine values can be predicted from sulfur content, 325 mesh and/or particle sizes that might be known for a given carbon black. Further, there is no teaching,



motivation, or prediction of success for one skilled in the art to make the carbon blacks having the particular combined parameters of claim 1.

Claims 2-21, 24, 26-30, and 34-40, which ultimately depend from claim 1, are not anticipated by nor obvious over Sant '251, Industrial Carbon, or the Medalia article, for at least the same reasons as set forth above relative to their parent claim 1, and reference is made thereto.

In view of the above, the applicant requests reconsideration and withdrawal of the rejection.

**Rejection of Claims 1-10, 26, 29-33, and 41 based on Non-statutory Obviousness-Type Double Patenting in view of U.S. Patent No. 6,482,386, Industrial Carbon, and the Medalia Article**

At page 3 of the Office Action, claims 1-10, 26, 29-33, and 41 were rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-21 of U.S. Patent No. 6,482,386 in view Industrial Carbon and the Medalia Article. The Examiner states that although the conflicting claims are not identical, they are not patentably distinct from each other because the numerical values overlap. The Examiner states column 4 teaches a tube shape and fluffy form, which indicates the 325 mesh limitation is met. The Examiner further refers to col. 3, which refers to Sant '250. The Examiner states that if both are made by the same process, then they are *prima facie* patentably indistinct. This rejection is respectfully traversed.

The analysis of possible obviousness double patenting is focused on whether “conflicting claims” are present between the instant application and the previously issued patent to assignee, and not whether there may be a conflicting claim when combined with unclaimed specification disclosures, as suggested in the Final Office Action (e.g., see M.P.E.P. § 804 *et seq.*).

U.S. Patent No. 6,482,386 fails to claim, or teach in the supporting portions of the specification, any values for sulfur contents, 325 mesh residues, or ash contents. Sulfur amounts

of preferably less than about 1000 ppm are mentioned in U.S. Patent No. 6,482,386 for the *feedstock*, but not for the carbon product *per se* (col. 4, lines 4-5). The Examiner states that even assuming that no S is lost as SO<sub>2</sub> during combustion, then 1000 ppm is the same as 0.1% S, so the S content appears met (Office Action, page 6). The applicant respectfully disagrees as the Examiner's rationale does not account for losses in non-sulfurous mass content of the feedstock occurring during combustion of the feedstock, which would tend to concentrate the original S content, and not keep it the same, in the carbon black that is formed. Therefore, when comparing the claims of the present application with the claims of U.S. Patent No. 6,482,386, the presently claimed carbon black, with *all* its recited features being considered in combination, is not claimed by U.S. Patent No. 6,482,386, nor is it disclosed to be an obvious variation in the supporting portions of the specification of the patent to the compositions as claimed in U.S. Patent No. 6,482,386.

With respect to the assertion in the Office Action that the teaching of a tube shape or fluffy form at column 4 of U.S. Patent No. 6,482,386 indicates the 325 mesh limitation for the carbon black of claim 1 is met, the applicant disagrees because this assertion by the Examiner is based on a misreading of the patent reference or fails to explain a nexus between these shapes and the 325 mesh recitation of the carbon black recited in claim 1. In fact, column 4, lines 51-65 of U.S. Patent No. 6,482,386 does *not* refer to tube-shaped carbon black shapes, but instead refers to tube shapes of *extruded articles* made with polymeric compositions containing the carbon black. Column 4, lines 16-19 of U.S. Patent No. 6,482,386 refer to fluffy or pelletized forms of carbon black, but the Examiner does not provide an explicit analysis of any connection alleged to inherently arise between either of such morphologies and the 325 mesh limitation recited in claim 1.

The Examiner also references the Industrial Carbon and Medalia references. However, these

references differ from the present claims as explained above, and reference is made thereto, and they would not make up for the differences between the present claims and the claims of the '386 patent. For example, and as explained above with respect to the Industrial Carbon reference, this reference specifically states that carbon blacks leave traces on the 325 mesh screen and the weight percents can be from 0.03 to 0.15 percent. 0.03 percent equates to 300 ppm, which is outside of the range recited in claim 1, which is a 325 mesh residue of less than 20 ppm. Again, neither the claims nor specification of assignee's U.S. Patent No. 6,482,386 make reference to 325 mesh residues, sulfur levels, or ash contents.

With respect to the Examiner's comment at page 3 of the Office Action that assignee's U.S. Patent No. 6,482,386 also makes reference to the Sant '250 reference, the applicant again explains that the term "carbon black products" is referred to when the present application refers at page 13 to Sant '250, and not the term "carbon blacks." U.S. Patent No. 6,482,386 appears to refer to "carbon blacks" of Sant '250 at column 3, line 43 to column 4, line 12. In view of this clarification, U.S. Patent No. 6,482,386, and inclusive of any internal reference therein to Sant '250, does not teach or suggest the carbon blacks of the present invention as set forth, for instance, in claim 1 and the dependent claims. Again, no admission was made that the Sant '250 patent or '251 patent teaches or suggests the claimed invention.

In view of at least the above differences, none of claims 1-10, 26, 29-33 and 41 are obvious over claims 1-21 of Assignee's U.S. Patent No. 6,482,386.

Reconsideration and withdrawal of this rejection are respectfully requested.

**Rejection of Claims 1-9, 11-17, 19-21, 24-26, 28-29, and 34-36 under 35 U.S.C. §102(b) and §103(a) -- Yamazaki et al. in view of Weaver et al., Dickerson, Industrial Carbon, and the Medalia Article**

At page 3 of the Office Action, claims 1-9, 11-17, 19-21, 24-26, 28-29, and 34-36 were rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,025,429 to Yamazaki et al. in view of U.S. Patent No. 5,352,289 to Weaver et al., U.S. Patent No. 4,755,371 to Dickerson, Industrial Carbon, and the Medalia article. The Examiner refers to Example 6 and col. 11 of Yamazaki and to Table 1. The Examiner states Weaver teaches in col. 3 that acetylene blacks are known to be low in ash and S, which is expected because they are made from a source which contains little or no S or metals, and notes also the DBP values recited. The Examiner states that it appears that the carbon of Yamazaki is patentably indistinct from that which is claimed. The Examiner states Dickerson teaches in column 6 the claimed 325 mesh residue for carbon black. The Examiner states the Industrial Carbon reference is presented as evidence that as-synthesized carbon blacks meet the 325 mesh limitation, as is Medalia (*supra*). The Examiner states that, therefore, it appears based upon this additional evidence that the carbon black of Yamazaki renders the claims unpatentable, and the particle size is unknown, but a difference should be shown, and col. 1 of Yamazaki teaches polymers and col. 3 teaches the loading. This rejection is respectfully traversed.

Yamazaki et al. teaches thermal decomposition of “acetylene,” as the feedstock material, to form acetylene black powder feed, which in turn is granulated (see col. 3, lines 46-49; col. 9, lines 10-35). As previously pointed out, the present claims recite, *inter alia*, an ash content of less than 0.1%. With respect to the Examiner's reliance on Yamazaki et al., it is respectfully noted that the grit content and ash content of Yamazaki et al., including those in Table 1, are not based on ASTM standards, but instead are based on JIS standards, as indicated at col. 7, lines 36-55. It is

respectfully noted that the JIS standards are not the same as the ASTM standards relied upon in the present application. There is no evidence of record that measurement values obtained for grit content and ash content using the JIS standards are predictive in a known manner of results that would be obtained by ASTM standards. As indicated above, the various properties of the present invention are determined using ASTM test procedures and this was specifically indicated at pages 5-7 of the present application and elsewhere. Accordingly, reliance on these numbers in the Examiner's rejection without addressing how these numbers would correspond to ASTM standards fails to establish a *prima facie* case of obviousness or even anticipation.

In addition, it is respectfully noted that Weaver et al., while discussing carbon blacks, primarily relates to furnace carbon blacks, but does compare furnace carbon blacks to acetylene carbon blacks. It is further noted that the ash content and sulfur content mentioned in Weaver et al. are not based on an ASTM standard. Nor does Weaver et al. specifically teach that acetylene black contains zero sulfur, as suggested at page 7 of the Office Action (e.g. see col. 3, lines 21-29). The Examiner has not explained how the particular standards used in Weaver et al. would compare to the ASTM standards used in the present application.

With respect to the Examiner's reliance on Dickerson, the Examiner's reliance on the claimed 325 mesh is with respect to furnace carbon blacks and, therefore, its combination with Yamazaki et al. would be difficult at best. Merging acetylene carbon black properties with furnace carbon black properties simply is not a combination that one skilled in the art would make since the carbon blacks are made differently and have different properties. Even one reference relied upon by the Examiner, Weaver et al., acknowledges the difference in acetylene carbon blacks and furnace carbon blacks (e.g., col. 3, lines 23-47). Also, it appears that Weaver et al. does not use an ASTM standard to measure the 325 mesh and, therefore, has the same problems as the above-mentioned

references.

In addition, Weaver et al. fails to teach any I<sub>2</sub> No. or primary particle sizes of acetylene blacks. Dickerson refers to "Feedstock Oil" in the referenced EXAMPLE, and clearly does not relate to acetylene blacks (col. 5, line 49, col. 6, line 50), and thus Dickerson fails to possibly teach any "inherent" properties of the acetylene black of Yamazaki et al.

The Examiner also refers to the Industrial Carbon and Medalia references. However, these references differ from the present claims, as explained above, and they would not make up for the differences between the present claims and Yamazaki et al., Weaver et al., and Dickerson. For example, as explained above with respect to the Industrial Carbon reference, this reference relied upon by the Examiner does not provide a 325 mesh limitation of 200 ppm or less. In fact, the only number provided is a weight percent level of from 0.03 to 0.15%, which would be far above a 20 ppm level. As indicated above, 0.03 percent equates to 300 ppm, which is outside the range recited in claim 1. Further, Industrial Carbon has nothing to say about acetylene blacks in particular, and, therefore, it fails to possibly teach any "inherent" properties of the acetylene black of Yamazaki et al. At page 7 of the Office Action, the Examiner suggested that what Industrial Carbon teaches about 0.03 ppm 325 mesh residue is for poorer grades from the 1940's. However, Industrial Carbon does not quantify the "'trace' 325 mesh residue for good grades of carbon black" referenced at page 7 of the Office Action. Therefore, there is no evidence in the Industrial Carbon reference to determine with certainty that the "traces on 325-mesh screen" residue mentioned therein would meet the range recited in claim 1.

In addition, claim 1 and the claims dependent on claim 1 all require a carbon black having a primary particle size of not greater than 25 nm. Yamazaki et al., Weaver et al., Dickerson, the Industrial Carbon, and the Medalia article do not teach or even mention a primary particle size.

Claims 2-9, 11-17, 19-21, 24-26, 28-29, and 34-36, which ultimately depend from claim 1, are not anticipated by nor obvious over Yamazaki et al., Weaver et al., Dickerson, the Industrial Carbon reference, and the Medalia article, for at least the same reasons as set forth above relative to their parent claim 1, and reference is made thereto. Further, the recitation in claim 11 of an even smaller primary particle size of approximately 16 nm, in combination with an I<sub>2</sub> No. value of approximately 104 mg/g is even further distanced from Yamazaki et al., Weaver et al., Dickerson, the Industrial Carbon reference, and the Medalia article, which do not teach or even mention a primary particle size.

Accordingly, for at least these above reasons, this rejection should be withdrawn.

**Rejection of Claims 30-33 under 35 U.S.C. §103(a) -- Yamazaki et al. in view of Weaver et al., Dickerson, Industrial Carbon, Medalia Article, and WO 01/79345**

At page 4 of the Office Action, claims 30-33 were rejected under 35 U.S.C. §103(a) as obvious over Yamazaki et al. in view of Weaver et al., Dickerson, Industrial Carbon, and the Medalia Article, as applied to claims 1, 4, and 29, and further in view of WO 01/79345 ("WO '345")(counterpart of U.S. Patent No. 7,416,686 B2). The Examiner states that the above references do not teach the claimed pipe, however WO '345 teaches forming one to transport water or natural gas (both under pressure). The Examiner states that Weaver, at col. 3, shows that low S carbon black is desirable, where the water could be a problem, and that using the carbon black of Yamazaki in a pipe is an obvious expedient to avoid 'tree' formation. This rejection is respectfully traversed.

The comments above regarding the patentability of claim 1 in view of the cited references of Yamazaki et al. in view of Weaver et al., Dickerson, Industrial Carbon, and the Medalia Article, apply equally here. Further, Weaver, at col. 3, lines 5-20, refers to "waters trees" as a cause of underground *power cable* failure, which is believed to be due to the presence of water and water

soluble ions within *the cable*. Weaver indicates that *under normal voltage gradients existing in the cable*, the ionic materials tend to migrate through the cable insulation material, which can lead to cable failure. At column 17, line 65 to column 18, line 8, Weaver et al. repeats that the “water trees” problem under discussion therein pertains specifically to semi-conductive shielding compounds for electric power cables. WO ‘345 relates to a polymer composition for *pipes*, not power cables nor a structure under a voltage gradient similar to that existing in a power cable. Therefore, one of ordinary skill in the art would not reasonably predict or expect that concerns related to power cables under normal voltage gradients such as discussed by Weaver et al. would apply to pipes of WO ‘345. Power cables and water pipes have different structures, operate under different conditions, and are used for different purposes. Thus, Weaver et al. provides no apparent reason for one of ordinary skill to use a carbon black of Yamazaki et al. in a pipe.

Also, as indicated, claim 30 (and also claims 31, 32, and 33) are directed to products that can exploit the low ash content recited in parent claim 1 so as to yield, for example, enhanced organoleptics and CMA properties. As also indicated above, the Medalia article shows that conventional carbon blacks do not teach, suggest, or predict the success of such high purity carbon blacks as presently claimed in terms of the recited ash content and/or sulfur content. In particular, the Medalia article cited by the Examiner clearly and unequivocally teaches that a number of prior carbon blacks all had ash content *significantly exceeding* 0.1%. Medalia thus teaches away from the present claim 30. WO ‘345 also does not compensate for these differences between claims 30-33 and the other applied references. WO ‘345 does not appear to disclose any properties of carbon black that may be used in the polymer compositions of the reference.

Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.



**Rejection of Claims 1-3, 11-21, 24, 34-36, and 37-40 under 35 U.S.C. §102(b) and 35 U.S.C. §103(a) – Giet in view of Dickerson, Weaver et al., Medalia article, Industrial Carbon, and the Dee Snell article**

At page 4 of the Office Action, claims 1-3, 11-21, 24, 34-36, and 37-40 were rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 4,013,759 to Giet in view of Dickerson, Weaver et al., the Medalia article, Industrial Carbon, and the Dee Snell article (ENCYCLOPEDIA OF INDUSTRIAL CHEMICAL ANALYSIS *Ed. by F. Dee Snell et al., Vol. 8, pp. 163, 186-187, 243, Interscience Publishers*). The Examiner asserts that Giet shows a high purity carbon black which can possess the claimed area. The Examiner refers to the data in col. 6, and the ash and S content. The Examiner notes that Giet does not actually specify which (iodine or nitrogen) area is reported, so a difference may not exist, and iodine and nitrogen are shown to correlate by the cited Dee Snell/Schubert article. The Examiner concludes that even if Giet refers to the nitrogen and not iodine area, the claimed iodine area appear to be met. The Examiner further states that the 74 micron residue reported is 200 mesh; so the 200 mesh residue is known to be zero. This rejection is respectfully traversed.

The applicant observes that Giet describes only acetylene-like black having an electrical resistivity of 0.4 to 0.7 ohm/cm (under pressure of 6.3 bars), a carbon content higher than 99%, an adsorption capacity for water of filter index of at least about 80 gm of 3% acetic water for 5 gm of carbon black, a particle size less than about 200 A, a surface area in the range of 85 to 115 m<sup>2</sup>/gm, and processes for making these acetylene-like blacks (see col. 8, lines 1-27).

Present claim 1 recites, *inter alia*, an ash content of less than 0.1% as measured by ASTM D-1506 and a total sulfur content of less than about 2% as measured by ASTM D-1619. Giet is also silent on ash content and sulfur values of the acetylene-like blacks. Column 6 of Giet, which was referenced in the Office Action (page 5), does not provide for both ash and

sulfur contents that are *necessarily* mathematically met *with certainty* by subtraction from 100%. At column 6, lines 34-37, Giet indicates that the carbon content of the acetylene-like black is about 99.8% and the hydrogen and oxygen content is very low, the H<sub>2</sub> content is, for example, approximately 0.05%. Thus, the combined amounts of carbon and hydrogen of the acetylene-like black of Giet can be 99.85%, which mathematically would leave 0.15% available for other components. Therefore, by mathematical subtraction using these numbers in the cited reference, it is possible for the acetylene-like black of Giet to contain *more than* 0.1% ash content, which does not meet the ash content recitation of claim 1, and contrary to the suggestion made in the rejection.

Present claim 1 also recites, *inter alia*, a 325 mesh (0.044 mm) residue of less than 20 ppm as measured by ASTM D-1514. The applicant submits that the only apparent reference made in Giet to a screen size is a mesh size of 0.074 mm, which the Examiner equates in the Final Office Action with 200 mesh (see col. 6, lines 10-11). Further, this reference in Giet is made in the limited context of a filter index measurement made on 5 g samples of black (see col. 6, lines 6-21). In this respect, Giet indicates that a 5 g sample of black, on which the filter index value measurement is conducted, is “previously screened through a screen having a mesh size of 0.074 mm” (col. 6, lines 10-11). Thus, for filter index testing, Giet recovers the fraction of black particles of the entire product sample that are smaller than about 0.074 mm before conducting the filter index test on that smaller fraction. However, for the fraction of the black particles that are 0.074 mm or larger, Giet provides no particle quantity information. Giet does not state that the residue on the 0.074 mm (200 mesh) size screen was known to be zero, as alleged in the Final Office Action. In fact, if there was zero residue on the 0.074 mm mesh size, there would be no logical reason for one skilled in the art to be conducting the sieving at that particular mesh size.

As also can be technically understood, particles large enough to be retained on 0.074 mm (200 mesh) size would inherently all be retained on an even smaller mesh size of 325 mesh (0.044 mm). However, as indicated, Giet fails to provide the residue (retained) information for the larger 0.074 mm mesh size. Also, it can be technically appreciated that for the fraction of black particles of Giet's black product that passes through 0.074 mm (200 mesh) size, it is theoretically possible that none, some, or even all of that fraction could be retained as "residue" on a smaller mesh size of 325 mesh (0.044 mm). Thus, knowledge from Giet that some fraction of the black particles of an acetylene black product passed through 0.074 mm (200 mesh) size does not at all permit any technical inference to be drawn with any certainty about the 325 mesh residue quantity of that same product sample.

With respect to particle sizes, Giet also indicates that the acetylene-like black has particle sizes "in the range of 150 to 200 A ... measured by nitrogen adsorption" (col. 6, lines 45-48). The applicant points out that particle size estimation by nitrogen adsorption does *not* correspond with particle size measurements determined by ASTM D3849-89, such as recited for primary particle sizes in present claim 1. It is explained that primary particle size measurement according to ASTM D3849-89 is a measurement of number-average primary particle size determined by using a transmission electron microscope at a magnification of 30,000 for 100 particles selected at random. For example, at col. 18, lines 23-27 of U.S. Patent No. 5,856,055, the patent explains these details of the ASTM D3849-89 procedure. A partial copy of the above-referenced passages in U.S. Patent No. 5,856,055, which was downloaded from the US PTO's website, is reproduced in relevant part below.

5,856,055

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1-70 nm, a BET specific surface area according to nitrogen adsorption (SBET) of at most 100 m<sup>2</sup>/g, a pH of at least 2.0, a volatile matter content of at most 2 wt. %, and a DBP (dibutyl phthalate) absorptivity of 50-200 ml/g.

The carbon black may have an average primary particle size of 10-70 nm, more preferably 20-60 nm, further preferably 25-45 nm. If the carbon black has an average primary particle size of below 10 nm, the polymerizable monomer composition containing the carbon black as well as the specific azo iron compound is liable to have an excessively large viscosity, and the fine particle formation thereof without agglomeration becomes difficult. Further, because of too small a primary particle size, it becomes difficult to disperse the carbon black in the polymerizable monomer composition. On the other hand, if the carbon black has an average primary particle size in excess of 70 nm, only a low coloring power can be attained even if it is well dispersed and, when used in a large amount in order to increase the coloring power, the resultant toner is caused to have a lower chargeability.

It is preferred that the carbon black has a pH of at least 2.0, more preferably at least 4.0. If the carbon black has a pH below 2.0, the carbon black is caused to have many functional groups, which are liable to inhibit the polymerization.

It is preferred that the carbon black has a specific surface area (S<sub>BET</sub>) of at most 100 m<sup>2</sup>/g, more preferably 30-90 m<sup>2</sup>/g, further preferably 40-90 m<sup>2</sup>/g. The volatile matter content of the carbon black may preferably be at most 2 wt

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compound and 10 wt. parts of carbon black was stirred by means of a stirrer at 200 rpm for 180 min. On the other hand, another polymerizable mixture was prepared similarly except for omitting the addition of the azo iron compound. The two mixtures were tested by standing for evaluation of dispersion stability. As a result, the mixture containing no azo iron compound caused precipitation after 3 days, whereas the mixture containing the azo iron compound was free from precipitation even after 30 days of standing.

The above-mentioned values for the respective properties of carbon black are based on values measured according to the following methods:

(1) DBP absorptivity

Measured by dripping DBP (dibutyl phthalate) onto a dry sample of carbon black (according to JIS K6221, A-method).

(2) Specific surface area (S<sub>BET</sub>) according to nitrogen adsorption

Measured according to ASTM D3037.

(3) Volatile matter content

Determined by measuring the weights before and after heating of a carbon black sample (according to JIS K6221).

(4) Average primary particle size

A number-average primary particle size is determined by using a transmission electron microscope at a magnification of 30,000 for 100 particles selected at random (according to ASTM D3849-89).

(5) pH

Thus, it is unknown and can not be predicted with certainty whether the primary particle size values reported by Giet is equivalent to a primary particle size of not greater than 25 nm as measured by ASTM D3849-89, as recited in claim 1.

In addition, the Examiner still appears to ultimately equate the "surface area" values mentioned by Giet (e.g. see column 6, lines 29-33 and column 8, lines 8, 16-17), with the iodine numbers recited in the present claims. First, the lack of a teaching in Giet on whether the surface area reported is iodine or nitrogen surface area, is not a teaching of the missing information. Second, Giet does not teach that the surface area values reported therein are nitrogen adsorption surface area values in particular. Giet indicates that nitrogen adsorption was used for particle size measurement, not surface area measurement (e.g. see column 6, lines 42-48 and column 8, lines 6-7, 14-16). Other possibilities exist, such as CTAB surface area values. Nor is any applicable surface area measurement standard indicated by Giet. Further, even assuming for sake of argument only, that Giet intended to refer to nitrogen adsorption surface area values, it is

technically flawed to automatically assume that those values would numerically correspond with iodine absorption surface area values for the same product.

With respect to the Examiner's assertion in the rejection that iodine numbers and nitrogen values are shown to "correlate" by the Dee Snell article, the applicant respectfully disagrees with this statement. If iodine numbers and nitrogen values correspond to each other, there would be no reason to have each test and yet the carbon black industry clearly measures carbon blacks using both tests as an ordinary practice in this field. It is noted that the applicant previously submitted in the record before the Examiner a copy of an article on carbon black from the *ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY*, Vol. 4, 4<sup>th</sup> Ed., 1992, with applicant's response of July 20, 2006, which summarizes the various test methods for surface area and other analytical methods. As shown in that article of record, iodine adsorption is based on the amount of iodine adsorbed from an aqueous solution, wherein nitrogen surface area, such as BET surface area, is calculated from the amount of adsorbed nitrogen at liquid nitrogen temperature, (see Table 5, page 1058). Further, the supplied chart from the *ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY*, namely Table 7 (see page 1061), further shows that iodine numbers can be different from nitrogen surface area.

Further, the Examiner's reliance on the Dee Snell article as evidence showing that iodine numbers and nitrogen surface areas correlate is flawed. The plot shown in Figure 7 on page 186 of Dee Snell may appear, for sake of argument, to generally show a correlation between nitrogen surface area and iodine adsorption for "furnace blacks." However, Figure 7 is explained in greater detail on subsequent page 187 of the Dee Snell article. The Dee Snell article clearly indicates on page 187 that the correlation for rubber grade carbons, such as shown in Figure 7, is not universal. In particular, the Dee Snell indicates that the iodine adsorption-nitrogen surface area correlation for rubber grade carbons may only apply to certain types of carbons, such as low-volatile, nonporous

carbons. The Dee Snell article further explains on page 187 that “[d]eviations from linearity in the BET nitrogen-iodine adsorption correlation” occur with some types or classes of carbons, such as “carbons having a highly unsaturated oil on the surface or an oxygen volatile content per unit surface area significantly greater than the rubber grade furnace carbons.” The Examiner has not identified any specific carbon black in Giet that is considered by the Examiner to correspond to the specific types identified by Dee Snell having iodine and nitrogen surface area correlation, and as distinguished from other types of carbon blacks that would not correlate or be predicted to correlate according to the Dee Snell article. Thus, the Dee Snell article is not evidence that shows with certainty that any carbon blacks of Giet inherently will be predicted and expected to have nitrogen surface area values that correlate with iodine adsorption values. Thus, insufficient information in Giet does not permit or support an inference that the “surface area” values of Giet correspond numerically to iodine values.

Dickerson, Weaver et al., the Medalia article, and Industrial Carbon do not cure the deficiencies of the primary reference of Giet relative to claim 1 for similar reasons as explained above with respect to the rejection based on Yamazaki et al., and reference is made thereto.

Claims 2-3, 11-21, 24, 34-36, and 37-40, which ultimately depend from claim 1, are not anticipated by nor obvious over Giet, Dickerson, Weaver et al., the Medalia article, Industrial Carbon, and the Dee Snell article, for at least the same reasons as set forth above relative to their parent claim 1, and reference is made thereto.

Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

**Rejection of Claims 1-21, 24, 26-30, and 34-40 under 35 U.S.C. §103(a) -- Giet in view of Dickerson, Weaver et al., Medalia article, Industrial Carbon, and van Konynenburg et al.**

At page 5 of the Office Action, claims 1-21, 24, 26-30, and 34-40 were rejected under 35 U.S.C. §103(a) as obvious over Giet in view of Dickerson, Weaver et al., the Medalia article, Industrial Carbon, and U.S. Patent No. 4,775,778 to van Konynenburg et al. The Examiner indicates that Giet does not show a polymer material, but teaches the advantages thereof in col. 1. The Examiner indicates that using the claimed polymers is an obvious expedient to provide an 'electro-conductive rubber' composition, and that the amount of carbon is deemed an obvious expedient of optimization of properties. This rejection is respectfully traversed.

Van Konynenburg et al. does not teach or suggest that the amount of acetylene-like blacks, such as those of Giet, as used in a polymer composition would have been an obvious expedient at the time of the present invention. Further, the Office Action does not indicate where van Konynenburg et al. teaches or suggests the use of an acetylene black in any polymer composition. Further, the Examiner's reliance on the authority of *In re Boesch*, 205 USPQ 15, at page 5 of the Office Action is misplaced as van Konynenburg et al. does not teach or suggest at columns 8 and 15 thereof that the carbon black *amount or proportion* is a results-effective variable to be optimized (see M.P.E.P. §2144.05, citing *In re Boesch*). The Office Action also does not identify which examples at column 15 of van Konynenburg et al. may be considered by the Examiner to disclose conventional ratios of polymer and carbon relevant to the present invention.

Further, and as explained in the applicant's Appeal Brief of December 5, 2008 and other previous responses, van Konynenburg et al. describes different carbon blacks from the present claims with respect to at least one of the presently recited carbon black properties, such as for example, the iodine number of from about 50 to about 112 mg/g. Further, van Konynenburg et al.

does not teach or suggest any sulfur contents or ash contents, and did not consider it relevant from the standpoint of performance of the carbon black in polymer compositions.

In view of the above, the applicant respectfully submits that there is no adequate factual basis that can be derived from van Konynenburg et al. to properly support and reach a conclusion that van Konynenburg et al. compensates for any of the above-identified deficiencies of Giet relative to claim 1.

Further, Dickerson, Weaver et al., the Medalia article, and Industrial Carbon, do not cure the above-indicated deficiencies of the primary reference to Giet relative to claim 1 for similar reasons as explained above with respect to the rejection based on Yamazaki et al., and reference is again made thereto.

Claims 2-21, 24, 26-30, and 34-40, which ultimately depend from claim 1, are not obvious over Giet, Dickerson, Weaver et al., the Medalia article, Industrial Carbon, and van Konynenburg et al., for at least the same reasons as set forth above relative to their parent claim 1, and reference is made thereto.

Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

**Rejection of Claims 30-33 under 35 U.S.C. §103(a) -- Giet in view of Dickerson, Weaver et al., Medalia article, Industrial Carbon, van Konynenburg et al., and WO 01/79345**

Beginning near the bottom of page 5 of the Office Action, claims 30-33 were rejected under 35 U.S.C. §103(a) as obvious over Giet in view of Dickerson, Weaver et al., the Medalia article, Industrial Carbon, and van Konynenburg et al. as applied to claims 1, 4, and 29 above, and further in view of WO 01/79345 (WO '345). The Examiner appears to rely on WO '345 for combination with the other references for similar reasons as indicated above with regard to the rejection of claims 30-33 based on Yamazaki et al. as the primary reference, and reference is made



thereto. This rejection is respectfully traversed.

As indicated, WO '345 relates to a polymer composition for pipes, not power cables nor a structure under a voltage gradient similar to that existing in a power cable, which is the subject matter of the "water trees" discussion at columns 3 and 17-18 of Weaver et al. As indicated, one of ordinary skill in the art would not reasonably predict or expect that concerns related to power cables under normal voltage gradients such as discussed by Weaver et al. would apply to pipes of WO '345. Thus, Weaver et al. provides no apparent reason for one of ordinary skill to use a carbon black of Giet in a pipe. Further, WO '345 also does not compensate for the above-indicated differences between claims 30-33 and the other applied references.


Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

### **CONCLUSION**

In view of the foregoing remarks, the applicant respectfully requests the reconsideration of this application and the timely allowance of the pending claims.

If there are any fees due in connection with the filing of this response, please charge the fees to Deposit Account No. 03-0060. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such extension is requested and should also be charged to said Deposit Account.

Respectfully submitted,

  
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U.S. Patent Application No. 10/620,269  
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